1. Choose the interval below that f composed with g at $x = -1$ is in.

$$f(x) = x^3 - 3x^2 - 2x + 1 \text{ and } g(x) = 4x^3 + 4x^2 - x$$

A. $(f \circ g)(-1) \in [9.3, 10.38]$

B. $(f \circ g)(-1) \in [-3.32, -2.98]$

C. $(f \circ g)(-1) \in [1.64, 2.57]$

D. $(f \circ g)(-1) \in [-0.35, 1.66]$

E. It is not possible to compose the two functions.

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2. Determine whether the function below is 1-1.

$$f(x) = 36x^2 + 480x + 1600$$

A. No, because there is a y-value that goes to 2 different x-values.

B. Yes, the function is 1-1.

C. No, because the domain of the function is not $(-\infty, \infty)$.

D. No, because the range of the function is not $(-\infty, \infty)$.

E. No, because there is an x-value that goes to 2 different y-values.

---

3. Multiply the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = \sqrt{-4x + 11} \text{ and } g(x) = 6x + 4$$

A. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-0.25, 5.75]$

B. The domain is all Real numbers except $x = a$, where $a \in [-6.8, -0.8]$

C. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-12.4, -2.4]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-9.4, -1.4]$ and $b \in [2.33, 14.33]$

E. The domain is all Real numbers.

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4. Find the inverse of the function below. Then, evaluate the inverse at $x = 10$ and choose the interval that $f^-1(10)$ belongs to.

$$f(x) = e^{x-5} + 2$$

A. $f^{-1}(10) \in [3.11, 3.77]$

B. $f^{-1}(10) \in [6.93, 7.45]$

C. $f^{-1}(10) \in [-2.94, -2.59]$

D. $f^{-1}(10) \in [4.02, 4.57]$

E. $f^{-1}(10) \in [4.57, 4.97]$

---

5. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -13$ and choose the interval that $f^-1(-13)$ belongs to.

$$f(x) = \sqrt[3]{3x + 5}$$

A. $f^{-1}(-13) \in [722.67, 732.67]$

B. $f^{-1}(-13) \in [734, 740]$

C. $f^{-1}(-13) \in [-735, -733]$

D. $f^{-1}(-13) \in [-732.67, -723.67]$

E. The function is not invertible for all Real numbers.

---

6. Choose the interval below that f composed with g at $x = 1$ is in.

$$f(x) = 2x^3 - 1x^2 + 4x - 4 \text{ and } g(x) = -2x^3 + x^2 + 2x + 1$$

A. $(f \circ g)(1) \in [15, 25]$

B. $(f \circ g)(1) \in [-8, -5]$

C. $(f \circ g)(1) \in [-1, 3]$

D. $(f \circ g)(1) \in [23, 36]$

E. It is not possible to compose the two functions.

---

7. Add the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = 8x^4 + 8x^3 + 4x^2 + x \text{ and } g(x) = \frac{5}{5x + 22}$$

A. The domain is all Real numbers except $x = a$, where $a \in [-6.4, 0.6]$

B. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-8.33, -0.33]$

C. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-1.17, 6.83]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [3.67, 16.67]$ and $b \in [-9.17, -5.17]$

E. The domain is all Real numbers.

---

8. Find the inverse of the function below. Then, evaluate the inverse at $x = 8$ and choose the interval that $f^-1(8)$ belongs to.

$$f(x) = e^{x+2} + 5$$

A. $f^{-1}(8) \in [6.73, 6.89]$

B. $f^{-1}(8) \in [7.35, 7.89]$

C. $f^{-1}(8) \in [-1.17, -0.58]$

D. $f^{-1}(8) \in [2.92, 3.25]$

E. $f^{-1}(8) \in [6.92, 7.48]$

---

9. Determine whether the function below is 1-1.

$$f(x) = 20x^2 - 68x - 736$$

A. Yes, the function is 1-1.

B. No, because the domain of the function is not $(-\infty, \infty)$.

C. No, because there is a y-value that goes to 2 different x-values.

D. No, because there is an x-value that goes to 2 different y-values.

E. No, because the range of the function is not $(-\infty, \infty)$.

---

10. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -10$ and choose the interval that $f^-1(-10)$ belongs to.

$$f(x) = 4x^2 - 5$$

A. $f^{-1}(-10) \in [1.26, 2.12]$

B. $f^{-1}(-10) \in [2.98, 3.66]$

C. $f^{-1}(-10) \in [1.05, 1.21]$

D. $f^{-1}(-10) \in [3.84, 4.42]$

E. The function is not invertible for all Real numbers.

---

11. Choose the interval below that f composed with g at $x = 1$ is in.

$$f(x) = 2x^3 + x^2 - 3x \text{ and } g(x) = -x^3 + 2x^2 - 3x$$

A. $(f \circ g)(1) \in [-8, -5]$

B. $(f \circ g)(1) \in [-8, -5]$

C. $(f \circ g)(1) \in [-3, 2]$

D. $(f \circ g)(1) \in [-16, -10]$

E. It is not possible to compose the two functions.

---

12. Determine whether the function below is 1-1.

$$f(x) = 16x^2 - 80x + 100$$

A. No, because the domain of the function is not $(-\infty, \infty)$.

B. No, because there is an x-value that goes to 2 different y-values.

C. No, because the range of the function is not $(-\infty, \infty)$.

D. No, because there is a y-value that goes to 2 different x-values.

E. Yes, the function is 1-1.

---

13. Multiply the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = \sqrt{-3x + 12} \text{ and } g(x) = 5x + 5$$

A. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-6.25, -2.25]$

B. The domain is all Real numbers except $x = a$, where $a \in [-6.4, 0.6]$

C. The domain is all Real numbers less than or equal to $x = a$, where $a \in [4, 6]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-7.8, -0.8]$ and $b \in [3.75, 7.75]$

E. The domain is all Real numbers.

---

14. Find the inverse of the function below. Then, evaluate the inverse at $x = 8$ and choose the interval that $f^-1(8)$ belongs to.

$$f(x) = e^{x+4} - 2$$

A. $f^{-1}(8) \in [-0.66, -0.48]$

B. $f^{-1}(8) \in [6.02, 6.73]$

C. $f^{-1}(8) \in [-0.35, -0.08]$

D. $f^{-1}(8) \in [-1.75, -1.28]$

E. $f^{-1}(8) \in [0.38, 0.63]$

---

15. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -12$ and choose the interval that $f^-1(-12)$ belongs to.

$$f(x) = 4x^2 - 3$$

A. $f^{-1}(-12) \in [3.32, 4.02]$

B. $f^{-1}(-12) \in [1.6, 2.66]$

C. $f^{-1}(-12) \in [5.18, 5.92]$

D. $f^{-1}(-12) \in [1.28, 1.69]$

E. The function is not invertible for all Real numbers.

---

16. Choose the interval below that f composed with g at $x = 1$ is in.

$$f(x) = -2x^3 + 2x^2 + 3x - 1 \text{ and } g(x) = -x^3 + 2x^2 - 2x + 4$$

A. $(f \circ g)(1) \in [-7, 5]$

B. $(f \circ g)(1) \in [-28, -27]$

C. $(f \circ g)(1) \in [-14, -6]$

D. $(f \circ g)(1) \in [-26, -22]$

E. It is not possible to compose the two functions.

---

17. Multiply the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = 5x^2 + 3x + 3 \text{ and } g(x) = 2x^4 + x^3 + 7x^2 + 8x + 9$$

A. The domain is all Real numbers less than or equal to $x = a$, where $a \in [3.5, 8.5]$

B. The domain is all Real numbers except $x = a$, where $a \in [4.8, 6.8]$

C. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-12.67, -5.67]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [4.2, 8.2]$ and $b \in [-10.6, -2.6]$

E. The domain is all Real numbers.

---

18. Find the inverse of the function below. Then, evaluate the inverse at $x = 5$ and choose the interval that $f^{-}1(5)$ belongs to.

$$f(x) = e^{x+2} - 3$$

A. $f^{-1}(5) \in [-2.77, -1.99]$

B. $f^{-1}(5) \in [-1.09, -0.58]$

C. $f^{-1}(5) \in [-0.74, 0.63]$

D. $f^{-1}(5) \in [-1.97, -1.86]$

E. $f^{-1}(5) \in [3.78, 4.92]$

---

19. Determine whether the function below is 1-1.

$$f(x) = 12x^2 - 114x + 252$$

A. No, because there is an x-value that goes to 2 different y-values.

B. No, because there is a y-value that goes to 2 different x-values.

C. Yes, the function is 1-1.

D. No, because the domain of the function is not $(-\infty, \infty)$.

E. No, because the range of the function is not $(-\infty, \infty)$.

---

20. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -13$ and choose the interval that $f^{-}1(-13)$ belongs to.

$$f(x) = \sqrt[3]{5x + 4}$$

A. $f^{-1}(-13) \in [438.59, 439.36]$

B. $f^{-1}(-13) \in [-439.72, -437.92]$

C. $f^{-1}(-13) \in [-440.63, -439.67]$

D. $f^{-1}(-13) \in [439.31, 440.26]$

E. The function is not invertible for all Real numbers.

---

21. Choose the interval below that f composed with g at $x = -1$ is in.

$$f(x) = 3x^3 + 3x^2 - 2x \text{ and } g(x) = -2x^3 - 3x^2 - 2x - 3$$

A. $(f \circ g)(-1) \in [-35.4, -34.9]$

B. $(f \circ g)(-1) \in [-11.2, -7.5]$

C. $(f \circ g)(-1) \in [-4.3, 0.9]$

D. $(f \circ g)(-1) \in [-33.6, -28.9]$

E. It is not possible to compose the two functions.

---

22. Determine whether the function below is 1-1.

$$f(x) = (5x - 18)^3$$

A. Yes, the function is 1-1.

B. No, because there is a y-value that goes to 2 different x-values.

C. No, because the domain of the function is not $(-\infty, \infty)$.

D. No, because the range of the function is not $(-\infty, \infty)$.

E. No, because there is an x-value that goes to 2 different y-values.

---

23. Multiply the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = 5x^4 + 9x^3 + 3x^2 + 4x + 8 \text{ and } g(x) = 2x + 2$$

A. The domain is all Real numbers except $x = a$, where $a \in [-9.2, -1.2]$

B. The domain is all Real numbers less than or equal to $x = a$, where $a \in [1.5, 7.5]$

C. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-11.33, 0.67]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [3.25, 6.25]$ and $b \in [-10.2, -3.2]$

E. The domain is all Real numbers.

---

24. Find the inverse of the function below. Then, evaluate the inverse at $x = 7$ and choose the interval that $f^-1(7)$ belongs to.

$$f(x) = \ln(x - 3) + 5$$

A. $f^{-1}(7) \in [8.39, 11.39]$

B. $f^{-1}(7) \in [162757.79, 162759.79]$

C. $f^{-1}(7) \in [22027.47, 22034.47]$

D. $f^{-1}(7) \in [56.6, 63.6]$

E. $f^{-1}(7) \in [-0.61, 5.39]$

---

25. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -11$ and choose the interval that $f^-1(-11)$ belongs to.

$$f(x) = 3x^2 - 4$$

A. $f^{-1}(-11) \in [1.94, 2.92]$

B. $f^{-1}(-11) \in [7.43, 7.82]$

C. $f^{-1}(-11) \in [1.19, 1.93]$

D. $f^{-1}(-11) \in [4.35, 5.19]$

E. The function is not invertible for all Real numbers.

---

26. Choose the interval below that f composed with g at $x = 1$ is in.

$$f(x) = -x^3 - 2x^2 + 2x + 3 \text{ and } g(x) = -4x^3 - 1x^2 + 2x + 2$$

A. $(f \circ g)(1) \in [0, 6]$

B. $(f \circ g)(1) \in [-30, -25]$

C. $(f \circ g)(1) \in [-5, -2]$

D. $(f \circ g)(1) \in [-25, -22]$

E. It is not possible to compose the two functions.

---

27. Multiply the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = 4x^4 + 2x^3 + 2x + 9 \text{ and } g(x) = 4x + 3$$

A. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-7, 1]$

B. The domain is all Real numbers except $x = a$, where $a \in [-4.4, 0.6]$

C. The domain is all Real numbers less than or equal to $x = a$, where $a \in [1.67, 3.67]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [7.2, 15.2]$ and $b \in [-7.6, -1.6]$

E. The domain is all Real numbers.

---

28. Find the inverse of the function below. Then, evaluate the inverse at $x = 7$ and choose the interval that $f^-1(7)$ belongs to.

$$f(x) = e^{x-2} - 3$$

A. $f^{-1}(7) \in [-0.52, 1.86]$

B. $f^{-1}(7) \in [-1.47, -0.87]$

C. $f^{-1}(7) \in [3.95, 4.49]$

D. $f^{-1}(7) \in [-1, -0.76]$

E. $f^{-1}(7) \in [-2.16, -1.55]$

---

29. Determine whether the function below is 1-1.

$$f(x) = 16x^2 + 128x + 256$$

A. No, because there is a y-value that goes to 2 different x-values.

B. No, because the range of the function is not $(-\infty, \infty)$.

C. No, because the domain of the function is not $(-\infty, \infty)$.

D. No, because there is an x-value that goes to 2 different y-values.

E. Yes, the function is 1-1.

---

30. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -15$ and choose the interval that $f^-1(-15)$ belongs to.

$$f(x) = \sqrt[3]{2x - 3}$$

A. $f^{-1}(-15) \in [1684, 1688.7]$

B. $f^{-1}(-15) \in [1686.8, 1691.3]$

C. $f^{-1}(-15) \in [-1691.2, -1687.3]$

D. $f^{-1}(-15) \in [-1687.2, -1683.8]$

E. The function is not invertible for all Real numbers.
